

IN THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the Application:

LISTING OF CLAIMS:

1. (Currently Amended) A storage system for storing data for at least one host computer, said system comprising:

a plurality of disk drives for storing and supplying said data;

a switch having a plurality of input and output ports, said switch being connected between said plurality of disk drives and said at least one host computer for at least connecting one of said input ports on which said data was received to one of said output ports;

an aggregator connected to said switch for at least managing operation of said plurality of disk drives; and,

operation coordinating logic operatively coupled to coordinate operation of said plurality of disk drives, said switch, and said aggregator in a manor to control flow of certain of said data between said at least one host computer and said plurality of disk drives to be through said switch and not through said aggregator and in a manner which does not change the operation of said at least one said host computers, the operation coordinating logic, when conveying data between a host computer and a disk drive, being configured to:

selectively (i) direct data exchanged between the host computer and the disk drive through the aggregator to improve security for the data, and (ii) divert the data exchanged between the host computer and the disk drive so that the data does not proceed through the aggregator to reduce latency.

2. (Original) The storage system of claim 1 and wherein said switch is a fibrechannel switch and said operation coordinating logic utilizes protocol including fibrechannel protocol.

3. (Original) The storage system of claim 2 and wherein said fibrechannel protocol includes fibrechannel FC2 frame headers.

4. (Original) The storage system of claim 3 and wherein each of said frame headers has a predetermined set of information fields.

5. (Original) The storage system of claim 4 and wherein said fields include but are not limited to destination ID, source ID, sequence ID, sequence count, originator's exchange ID, and respondent's exchange ID.

6. (Original) The storage system of claim 5 and wherein said operation-coordinating logic includes mapping logic for generating a mapping command designating said host computer as said source ID, said aggregator as said destination ID and first particular said originator ID, and further having a mapped destination ID which designates a particular one of said plurality of disk drives which is connected to a particular one of said output ports.

7. (Original) The storage system of claim 6 and wherein said operation-coordinating logic includes unmapping logic for generating an unmapping command designating said host computer as said source ID, said aggregator as said destination ID and said first particular said originator ID whereby the effect of the operation of said mapping command is neutralized.

8. (Original) The storage system of claim 6 and wherein said operation-coordinating logic includes proxy logic for generating a proxy command having said aggregator as said source ID, said particular one of said plurality of disk drives as said destination ID, and said first particular originator ID, and further having a proxy destination ID which designates a particular said at least one host computer.

9. (Previously Amended) The storage system of claim 7 and wherein said operation-coordinating logic includes transfer-ready logic for generating a transfer-ready command having said aggregator as said source ID, said host computer as said destination ID, and said first particular said originator ID.

10. (Previously Amended) The storage system of claim 7 and wherein said host computer generates data having said host computer as said source ID, said aggregator as said destination ID, and said first particular said originator ID.

11. (Original) The storage system of claim 5 including logic for selecting said certain of said data to obtain particular data words and wherein each of said words is operated upon by said operation-coordinating logic in a manner to steer said each of said such words directly to a particular one of said plurality of disk drives.

12. (Currently Amended) A computer data storage system wherein said data is grouped in frames, comprising:

- a plurality of disk drives for storing and retrieving said data;
- an aggregator for managing operation of said plurality of disk drives;
- each of said frames including a header containing binary fields designating parameters including at least destination ID, said header being associated with that portion of said data contained within said each of said frames; and,

a switch connected between said a host computer, said disk drives, and said aggregator for both controllably selecting certain ones of said frames and flowing said portion of said data grouped in said certain ones and having said aggregator as said destination ID directly between said host computer and said plurality of disk drives, whereby data transfer through said aggregator is avoided for said certain ones of said frames, the aggregator being associated with circuitry configured to:

selectively (i) direct data exchanged between the host computer and the disk drive through the aggregator to improve security for the data, and (ii) divert the data exchanged between the host computer and the disk drive so that the data does not proceed through the aggregator to reduce latency.

13. (Currently Amended) The system of claim 12 and wherein said switch includes, as the circuitry associated with the aggregator, switch control logic arranged to be commanded by said aggregator to selectively switch said certain ones of said frames directly between said host computer and said plurality of disk drives and all other of said frames indirectly therebetween through said aggregator.

14. (Original) The system of claim 13 and wherein said switch control logic includes a frame header field selector, an input frame header buffer, and a map table.

15. (Original) The system of claim 14, and wherein said frame header field selector is a frame header mask.

Claims 16-31 (Canceled).

32. (Currently Amended) The storage system of claim 1 ~~34~~ wherein the operation coordinating logic, when diverting the data exchanged between the host computer and the disk drive so that the data does not proceed through the aggregator to reduce latency, is configured to:

- receive a write command from the host computer;
- send a proxy command to the disk drive in response to the write command, the proxy command directing the disk drive to (i) bundle a Transfer Ready command in a communication that identifies the aggregator as a source of the communication and the host computer as a destination of the communication and (ii) provide the communication to the host computer so that the communication does not proceed through the aggregator.

33. (Currently Amended) The storage system of claim 1 ~~34~~ wherein the operation coordinating logic, when diverting the data exchanged between the host computer and the disk drive so that the data does not proceed through the aggregator to reduce latency, is configured to:

- receive a read command from the host computer;
- send a proxy command to the disk drive in response to the read command, the proxy command directing the disk drive to (i) bundle the data in a communication that identifies the aggregator as a source of the communication and the host computer as a destination of the communication and (ii) provide the communication to the host computer through the switch in a manner that diverts the communication so that the communication does not proceed through the aggregator.

34. (Canceled).

35. (Currently Amended) The computer data storage system of claim 12 34 wherein the circuitry associated with the aggregator, when diverting the data exchanged between the host computer and the disk drive so that the data does not proceed through the aggregator to reduce latency, is configured to:

receive a write command from the host computer;

send a proxy command to the disk drive in response to the write command, the proxy command directing the disk drive to (i) bundle a Transfer Ready command in a communication that identifies the aggregator as a source of the communication and the host computer as a destination of the communication and (ii) provide the communication to the host computer so that the communication does not proceed through the aggregator.

36. (Currently Amended) The computer data storage system of claim 12 34 wherein the circuitry associated with the aggregator, when diverting the data exchanged between the host computer and the disk drive so that the data does not proceed through the aggregator to reduce latency, is configured to:

receive a read command from the host computer;

send a proxy command to the disk drive in response to the read command, the proxy command directing the disk drive to (i) bundle the data in a communication that identifies the aggregator as a source of the communication and the host computer as a destination of the communication and (ii) provide the communication to the host computer through the switch in a manner that diverts the communication so that the communication does not proceed through the aggregator.

37. (Previously Added) A network-attached storage system, comprising:  
an aggregator device;  
a set of storage devices; and  
a switch coupled to a host computer, the aggregator and the set of storage devices; the aggregator device including aggregator circuitry configured to

organize the set of storage devices into an aggregation and specialized logic configured to decide whether data exchanged between the host computer and the set of storage devices flows through the aggregator device; the specialized logic, in response deciding whether data exchanged between the host computer and the set of storage devices flows through the aggregator device, being configured to selectively one of: (i) direct the data exchanged between the host computer and the set of storage devices through the aggregator device, and (ii) divert the data exchanged between the host computer and the set of storage devices so that the data does not proceed through the aggregator device.

38. (Previously Added) The network-attached storage system of claim 37 wherein the specialized logic, when diverting the data exchanged between the host computer and the set of storage devices so that the data does not proceed through the aggregator device, is configured to:

receive a write command from the host computer;

send a proxy command to the set of storage devices in response to the write command, the proxy command directing the set of storage devices to (i) bundle a Transfer Ready command in a communication that identifies the aggregator device as a source of the communication and the host computer as a destination of the communication and (ii) provide the communication to the host computer so that the communication does not proceed through the aggregator device.

39. (Previously Added) The network-attached storage system of claim 38 wherein the set of storage devices is configured to:

receive the proxy command from the specialized logic, bundle the Transfer Ready command in the communication that identifies the aggregator device as a source of the communication and the host computer as a destination of the communication and provide the communication to the host computer through the switch so that the communication does not proceed through the aggregator device.

40. (Previously Added) network-attached storage system of claim 37 wherein the set of storage devices is configured to:

receive a read command from the host computer;

send a proxy command to the set of storage devices in response to the read command, the proxy command directing the set of storage devices to (i) bundle the data in a communication that identifies the aggregator device as a source of the communication and the host computer as a destination of the communication and (ii) provide the communication to the host computer through the switch in a manner that diverts the communication so that the communication does not proceed through the aggregator device.

41. (Previously Added) The network-attached storage system of claim 38 wherein the set of storage devices is configured to:

receive the proxy command from the specialized logic, bundle the data in the communication that identifies the aggregator device as a source of the communication and the host computer as a destination of the communication and provide the communication to the host computer through the switch so that the communication does not proceed through the aggregator device.



42. (Previously Added) The network-attached storage system of claim 37 wherein the specialized logic is configured to selectively decide that (i) the data exchanged between the host computer and the set of storage devices flows through the aggregator device to improve security for the data through the network-attached storage system, and (ii) the data exchanged between the host computer and the set of storage devices does not flow through the aggregator device to reduce latency of the data through the network-attached storage system.